Survey Enclosed! Please complete and return by Novermber 16th

Wastewater Watch

A Kaleden & Skaha Estates Sewer Project UPDATE

October 2007

Report recommends Kaleden and Skaha Estates sewage be pumped to Okanagan Falls

Background

The Okanagan Falls Wastewater Advisory Committee was struck in 2004 to consider wastewater management challenges and potential solutions for portions of Electoral Area D, including Okanagan Falls, Kaleden, and Skaha Estates.

The nine-member committee's first task was to review and make recommendations regarding the existing wastewater treatment plant in Okanagan Falls.

In June 2005, the committee recommended the plant be relocated and upgraded to provide tertiary treatment using BNR technology (see page 4). As indicated by results of a mail-in survey, residents supported the recommendation, provided senior government funding would cover two-thirds of the cost. The Regional District of Okanagan Similkameen (RDOS) board also endorsed the recommendation, and applied for senior government funding of $8.9 million.

A site has been selected for the new plant; design and construction will commence when funding is finalized.

Current Considerations

The committee is currently considering an Earth Tech report regarding sewer service to the Kaleden lakeshore and Skaha Estates. As stated in the report, "Given that both these areas have aging septic systems and are in close proximity to Skaha Lake, installation of a community sewer has become a priority."

The report presented four options:

1) a satellite secondary treatment plant (RBC) in each community
2) a satellite tertiary treatment plant (BNR) in each community
3) a common secondary treatment plant located in either community
4) tie-in to the new Okanagan Falls treatment plant.

Results of the assessment show that the most cost-effective option is to pump sewage from the Kaleden lakeshore and Skaha Estates areas to the new treatment plant in Okanagan Falls.

You're Invited!

The Regional District of Okanagan Similkameen and the Wastewater Advisory Committee invite you to share your thoughts about the future of sewer servicing in the Kaleden lakeshore and Skaha Estates areas.

OPEN HOUSE

Okanagan Falls School Gymnasium
(1141 Cedar Street, Okanagan Falls)
Monday, November 5th
5 P.M. to 7 P.M.

Regional District staff will be available to answer your questions.

For more information contact Andrew Reeder at 250-490-4142 or areeder@rdos.bc.ca

Capital cost per parcel

Option	Kaleden lakeshore	Skaha Estates
1) Satellite RBC treatment plant	$37,500	$33,000
2) Satellite BNR treatment plant	$49,400	$42,500
3) Common RBC treatment plant	$33,500	$35,500
4) Tie-in to OK Falls treatment plant	$33,400	$29,000

Given the high costs of design, construction, and maintenance, sewer service will likely not proceed without senior government grant funding (see chart at left). The RDOS can apply for 18 percent grant funding from the Okanagan Basin Water Board, and two-thirds grant funding from the provincial/federal governments (see chart page 2).

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Funding Option	Kaleden Lakeshore		Skaha Estates	
	Total Capital Cost	Approximate Annual Financing Cost & Sewer User Fee*	Total Capital Cost	Approximate Annual Financing Cost & Sewer User Fee*
No Grant Funding	$33,400	$2,800	$29,000	$2,460
With Federal/Proviancial Infra-structure Grant (66.7%) and Okanagan Water Basin Board Grant (18%)	$5,120	$610	$4,446	$560

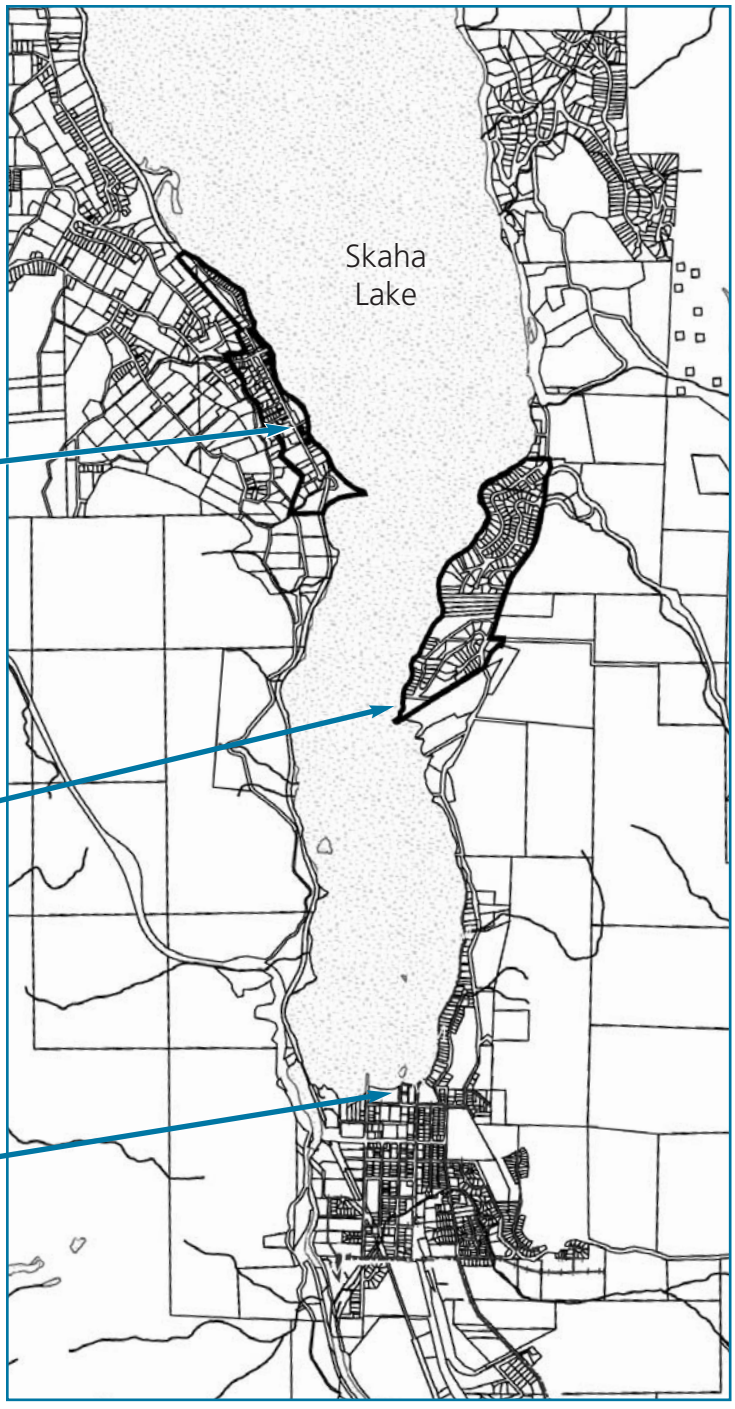
*** Assumes a 20-year loan to finance the capital cost**

Proposed sewer-system areas in Kaleden and Skaha Estates

The **Kaleden lakeshore** has been defined as a 32-hectare area with 142 lots along Skaha Lake between Ponderosa Point and the end of Alder Avenue. Most of these lots are built-out; subdivision of the surrounding larger agricultural parcels is constrained by the Agricultural Land Reserve, so a low population growth is assumed.

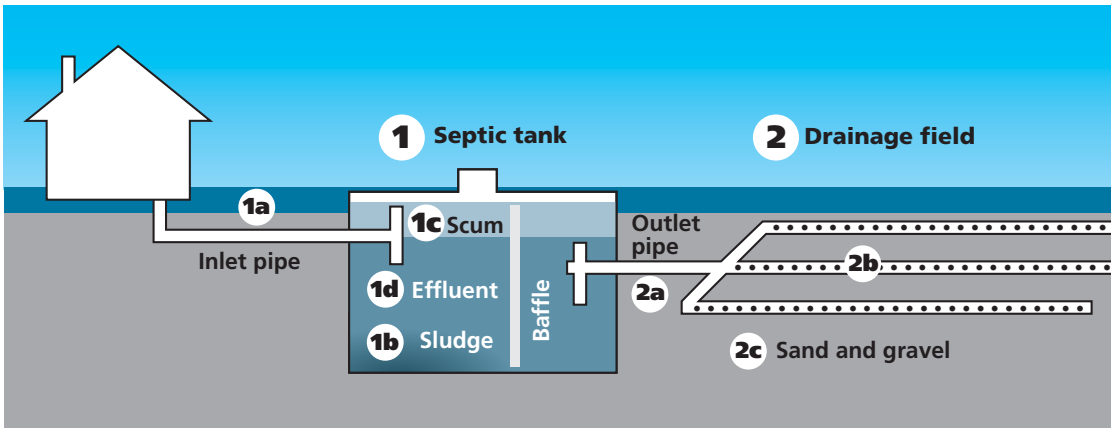
Skaha Estates is a 54-hectare portion of land along Skaha Lake with 183 lots. Its current population is 550. The community consists of a central area of built-out single-family residential lots surrounded by larger agricultural or Crown Land holdings. The single-family area targeted for sewering provides little opportunity for growth, so a nominal one percent annual growth rate is assumed.

Okanagan Falls Sewer System



Making sense of your septic system…

The purpose of a septic system is to collect, treat, and dispose of household wastewater ('sewage') from toilets, sinks, showers, washing machines, dishwashers, and garbage disposals. Every septic system has two main components: 1 a septic tank, and 2 a drainage field. Sewage flows into the septic tank through an inlet pipe 1a. The solids, ('sludge') 1b settle to the bottom, while lighter materials such as grease and oil ('scum') 1c float to the top. Natural bacteria in the wastewater feed on the sludge and scum causing it to break down or decompose. A semi-clear liquid called 'effluent' 1d — which forms between the layers of sludge and scum — flows through the outlet pipe 2a into the drainage field for the final stage of the treatment process. The drainage field includes a series of perforated pipes 2b that are usually placed in trenches and then surrounded by sand and gravel 2c. The trench is then covered with topsoil. As effluent flows through the pipes in the drainage field, it slowly seeps into the surrounding ground. Before the effluent reaches groundwater tables, naturally occurring bacteria in the surrounding soil further break down any remaining organic matter and nutrients.



The resulting organic material and associated nutrients are recycled back into the environment for use by plants, thereby continuing the nutrient cycle, or stored in the ground.

Wastewater often contains bacteria, nitrogen, and phosphorus. While properly functioning septic systems adequately filter bacteria such as *E.coli*, it would be prudent to have your drinking water tested regularly if the source is located near your septic system. Conventional septic systems do not break down and/or eliminate nitrogen or phosphorus, which can contaminate nearby drinking water supplies and impact marine and wildlife habitats by causing excess algae and weed growth.

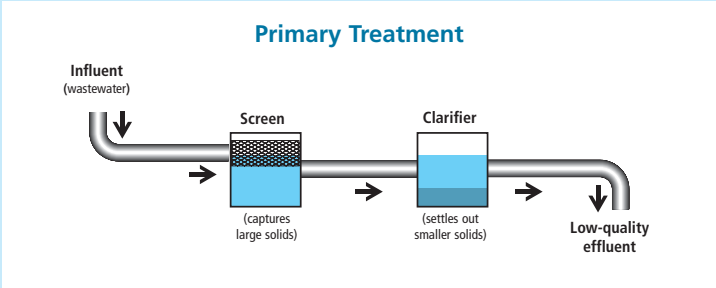
Understanding wastewater…

'Wastewater,' often called sewage, is the contaminated water resulting from residential, commercial, industrial, and agricultural uses before it undergoes any form of treatment. 'Domestic wastewater' is generated by residents having baths and showers and using their sinks, dishwashers, washing machines, and toilets. We each generate between 250 and 550 litres of wastewater daily.

Domestic wastewater contains contaminants from feces and urine and their ultimate decomposition. These can negatively impact environmental health and indirectly affect human health if not treated properly before being released back into the environment. Feces, for example, contain biodegradable organic material that consumes oxygen as it decomposes. Untreated wastewater, therefore, can endanger aquatic habitats by reducing the amount of oxygen available for fish. Wastewater effluent can also harbour high levels of nutrients such as nitrogen and phosphorus, which impact drinking water quality and promote algae growth that jeopardizes aquatic habitat and health.

Treatment Options

There are three levels of treatment commonly applied to wastewater: primary, secondary, and tertiary. Historically, wastewater treatment plants used **primary treatment** to remove only inorganic solids from wastewater before the resulting effluent was released into receiving waters such as rivers and lakes. While Victoria is a jurisdiction in BC that's producing primary effluent, it has been ordered by the Province to build a treatment facility.



Secondary treatment uses biological processes to remove the biodegradable organic material in wastewater. In essence, microorganisms grown in a bioreactor feed on the organic material. These microorganisms also offer a surface to which suspended particles attach themselves. These 'floc' particles settle out, and the clarified water is discharged as treated effluent.

Secondary treatment can be achieved using a fixed film process, an activated sludge process, or a lagoon process. A **fixed-film process** involves a surface, such as a rotating biological contactor or a sand filter, over which aerated wastewater flows. The biodegradable organic material is consumed by microorganisms, which attach themselves to the surface. The resulting sludge is then dewatered and stabilized before being disposed of or composted.

An **activated sludge process** uses microorganisms suspended in aerated wastewater rather than attached to a surface. By recycling some of the sludge (which contains microorganisms) back into the treatment process, the integrity of the microbiological colony is maintained.

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Understanding wastewater…

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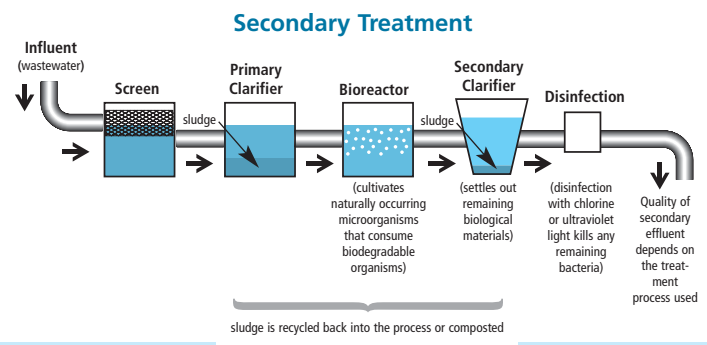
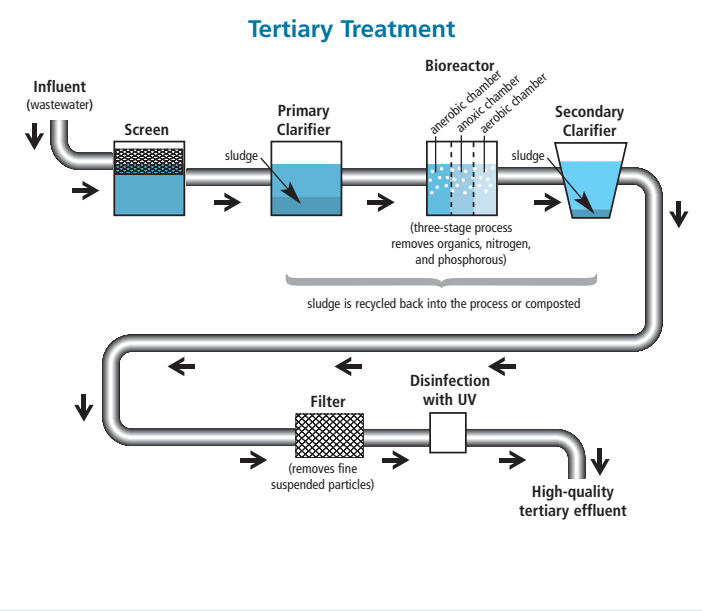
In a **lagoon process,** aerated wastewater is stored in large settling ponds. Solids settle to the bottom as sludge, which must be dredged every 15 to 20 years. While easy to monitor and maintain, lagoons require a relatively large amount of land.

Disinfection of the effluent using chlorine or ultra-violet light can also be included as part of a secondary treatment process. In BC, the resulting effluent can be infiltrated into the ground, used for irrigation, or, in some areas of the province, discharged to nearby rivers or lakes.

Septic systems provide either secondary or tertiary treatment, depending on location, soil conditions, climate, and maintenance frequencies.



Tertiary treatment removes both the biodegradable organic material and the nutrients in wastewater. Due to their negative impact on receiving water environments, the two nutrients of most concern are nitrogen and phosphorus. Removal of nutrients can be achieved biologically through chemical precipitation or a BNR (biological nutrient removal) treatment process. BNR is an advanced form of secondary treatment during which wastewater is exposed to varying levels of oxygen, which promotes rapid and thorough decomposition. This is generally followed by enhanced filtration and disinfection. The high-quality effluent can be reused for irrigation, used to enhance habitat in wetland environments, or discharged to a river or lake. Tertiary treatment is required for wastewater being discharged to Okanagan Lake.



Disposal or Reuse Options

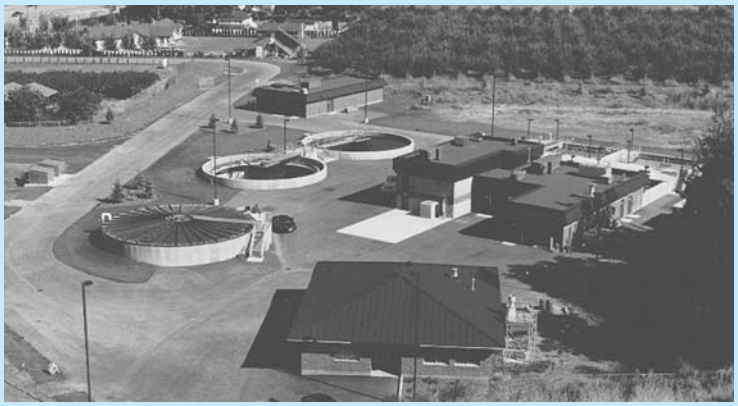
Once wastewater has been treated, the resulting effluent must be disposed of or used in some way.

Disposal methods include ground infiltration or river/lake discharge. Effluent disposed of through ground infiltration requires at least secondary treatment. Given current provincial regulations, any discharge of effluent into Shuswap Lake requires some level of tertiary treatment.

Treated effluent can be reused in many beneficial ways and should be considered a resource. Effluent (reclaimed water) reuse is regulated in BC by the Code of Practice for the Use of Reclaimed Water, which is a companion document to the Municipal Sewage Regulation. The code outlines water quality and monitoring standards for various types of reuse.

In general, a wastewater treatment plant designed to supply effluent for irrigation use must provide secondary or tertiary treatment. Any reuse system must be able to manage effluent during the winter months when there is no demand for irrigation, and must have a back-up effluent disposal system during wet years when there is a surplus of effluent. Effluent ponds are commonly used for winter effluent storage, and are required for aging of secondary effluent.

High-quality tertiary effluent may also be added to a stream to deliberately increase stream flow to improve fish habitat in the warm summer months when low water flows in creeks may pose a threat to fish. ■



Nitrogen and phosphorus act as fertilizers, which promote the growth of algae and other aquatic plants such as Eurasian Milfoil. These unwanted side effects pose serious recreational and environmental problems (e.g. reduced oxygen levels for fish). BNR treatment, such as that used this Summerland plant, removes nitrogen and phosphorus before the wastewater effluent is discharged to receiving waters.

Okanagan Falls Wastewater Advisory Committee

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